not lie within a 100-year floodplain. The nearest portion of the 100-year floodplain of the Columbia River is located within the site area approximately 0.5 mile south of the plant site. The other 100-year floodplain within the site area is Fourmile Canyon, which is located approximately 0.3 mile southeast of the plant site and would be crossed by the proposed access road.

Surface Water Quality and Use

The reach of the Columbia River adjacent to the site area is within Ecology's Water Resource Inventory Area (WRIA) 31. The Columbia River is classified as a Class A water source by Ecology (1997). Class A water quality meets or exceeds the requirements for all or substantially all uses, including water supply; stock watering; fish and shellfish rearing, spawning, and harvesting; wildlife habitat; recreation; and commerce and navigation. A summary table for water quality analyses from a sampling location near McNary Dam (see Appendix C) shows parameters to be generally within applicable standards, with a few exceedances for temperature, dissolved oxygen, pH, and turbidity.

Individual sampling locations on the Columbia River between John Day Dam and McNary Dam are on Ecology's 303(d) list. This list compiles water body segments that do not meet applicable water quality standards after implementation of technology-based controls (e.g., septic systems or water treatment) (Ecology 2002a). Excursions above these standards for samples collected from the river between the site area and McNary Dam included temperature, total dissolved gas, and dioxins. The list did not include specific discussions regarding the causes or frequency of these excursions, or of potential actions regarding these excursions.

3.3.1.1.2 Groundwater

Groundwater Occurrence and Flow

The aquifers supplying groundwater to wells in the site area consist of unconsolidated alluvial deposits within valleys incised into the underlying bedrock of the Columbia River basalts and permeable zones within the basalts. The unconsolidated deposits consist primarily of glacial alluvium deposited by Pleistocene glacial outburst floods, as well as surficial deposits of loess wind deposits (WDNR 1994). See Section 3.1, Earth, for more details on the geology of the site area. The two aquifers are present in the site area and are described below.

Unconsolidated Aquifer

The uppermost (shallow) aquifer is an unconfined, high-transmissivity alluvial deposit adjacent to the Columbia River (USGS 1999; Ecology 2002c). In the site area, the unconsolidated aquifer is bounded on the south by the Columbia River and at the base and to the north by basaltic bedrock. Wells in this aquifer vary in depth, but are typically between 30 and 90 feet deep (see Figure 3.3-3). Depth to groundwater in these wells is reported to be between approximately 20 and 65 feet below ground surface (bgs). Recharge to the aquifer is primarily through infiltration from the Columbia River, as well as infiltration of precipitation and irrigation water. Near the Columbia River, the aquifer has been designated by Ecology as being in direct hydraulic continuity with the river (Benton County 2000). Quantification of the hydraulic

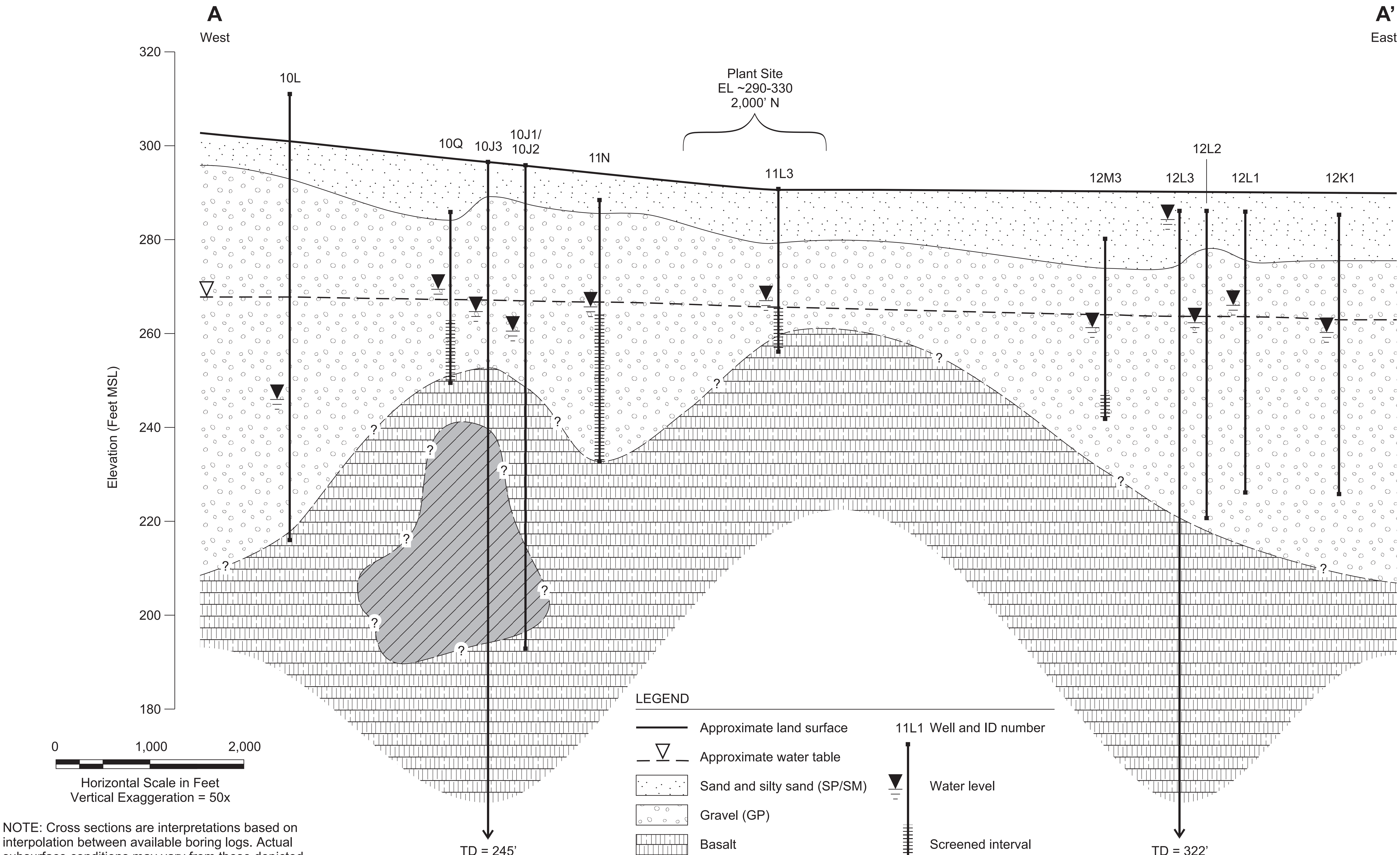

Figure 3.3-3

Generalized Geologic Cross Section

Figure 3.3-3 continued

connection between the aquifer and the river in the site area was not readily available. However, the USGS (1999) used averaged leakage values for a regional aquifer system analysis of the Columbia River Plateau, and Ecology considered groundwater withdrawals from the aquifer within 0.25 mile of the river to be equivalent to a direct surface water withdrawal (Benton County 2000). This influence affects both groundwater elevation and gradient within the shallow aquifer.

Groundwater within the unconsolidated aquifer is inferred to follow topography and flow southerly toward the Columbia River. Groundwater discharges from this aquifer as seepage to the Columbia River, transpiration by plants, groundwater outflow down valley, and withdrawals from wells.

Bedrock Aquifer

A limited number of wells in the site area are completed in basaltic bedrock underlying the unconsolidated materials. Bedrock elevations appear to vary significantly in the site area. Basalt bedrock is present at the ground surface north and northwest of the plant site (WDNR 1994), and borings encountered basalt at depths between approximately 30 to 90 feet bgs (Ecology 2002c) (see Figure 3.3-3). Groundwater in the basalt aquifer is confined. Reported water levels are available for five bedrock wells in the site area and vary from approximately 2 to 140 feet bgs (see Table 3.3-3).

Groundwater within the basalt aquifer is also inferred to follow topography and flow southerly toward the Columbia River. Groundwater in the site area discharges from the basalt aquifer as seepage to the Columbia River, groundwater outflow down valley, and withdrawals from wells.

Groundwater Use and Quality

Wells identified on the north side of the Columbia River and within an approximately 1-mile radius of the site area and associated corridors are shown on Figure 3.3-1. Twenty-three wells were identified, including 13 domestic wells, 8 irrigation wells, and 2 test wells (see Table 3.3-3). Most of the wells appear to be screened in the shallow unconsolidated aquifer. Seven of these wells are owned by Plymouth Farm and are located in the site area. The wells associated with Plymouth Farm are generally located along Christy Road (Figure 3.3-1). Site area well logs are included as Appendix C.

A groundwater sample was collected from one of the existing irrigation wells in the site area to assist with the design of the cooling system for the PGF (see Appendix A). Analysis was performed for inorganic analytes. Results indicate that groundwater quality in the site area is generally good, with the exception of nitrate levels exceeding drinking water standards (see Table 3.3-4). A report prepared by Ecology (1996) concluded that elevated nitrate concentrations are present in groundwater in many areas of the mid-Columbia River Basin, which includes Benton County. This conclusion was based on sampling of 783 wells in six counties, including 71 wells in Benton County. The wells sampled were not in the vicinity of the site area; however, many of the wells were reportedly shallow (less than 300 feet deep) and assumed to be completed in similar geologic formations and land use areas as the site vicinity

Table 3.3-3
Well Summary

Well I.D. Number[a]	Well Location	Owner	Estimated Surface Elevation (feet msl)	Well Depth (feet)	Depth to Water (feet bgs)	Estimated Groundwater Elevation (feet msl)	Remarks
T05N/R27E							
9A	Sec 9 NE1/4 NE1/4	Tod	395	276	140	255	Basalt aquifer well
9P	Sec 9 SE1/4 SW1/4	Joseph & Mary Christy	350	80	NA	NA	
10J1	Sec 10 NE1/4 SE1/4	Washington Fruit Co. Inc	295	62	44.5	250.5	Test Well Abandoned January 1992
10J2	Sec 10 NE1/4 SE1/4	Washington Fruit Co. Inc	295	48.5	35.5	259.5	Test Well Abandoned January 1992
10J3	Sec 10 NE1/4 SE1/4	Gibson Land and Livestock Co.	295	245	31	264	Site Well #2, location corrected per Aspect Engineering, basalt aquifer well
10L	Sec 10 SW1/4	Chelan Orchards	310	94	64.5	245.5	Approximate location
10Q	Sec 10 SW1/4 SE1/4	Howard Gibson	285	35.5	16.5	268.5	Site Well #1, location per Aspect Engineering
11L1	Sec 11 NE 1/4 SW 1/4	Washington Fruit Shore Properties	290	27.5	21	269	Site Well #4, location per Aspect Engineering
11L2	Sec 11 NE 1/4 SW 1/4	Washington Fruit Shore Properties	290	32	20	270	Site Well #5, location per Aspect Engineering
11L3	Sec 11 NE 1/4 SW 1/4	Washington Fruit Shore Properties	290	46	24	266	Site Well #6, location per Aspect Engineering
11L4	Sec 11 NE 1/4 SW 1/4	Washington Fruit Shore Properties	290	43	21	269	Site Well #7, location corrected per Aspect Engineering
11N	Sec 11 SW1/4 SW1/4	Cheran Orchards	287	55	23	264	Site Well #3, location corrected per Aspect Engineering
12K	Sec 12 NW1/4 SE1/4	Tom Longley	285	60	25	260	
12L1	Sec 12 NE1/4 SW1/4	Frank Nemer	286	60	20	266	
12L2	Sec 12 NE1/4 SW1/4	Dennis Marcum	286	65	24	262	
12L3	Sec 12 NE1/4 SW1/4	Edward Hounshell	286	326	2	284	Basalt aquifer well
12M1	Sec 12 NW1/4 SW1/4	Agapito Valdez	290	90	25	265	
12M2	Sec 12 NW1/4 SW1/4	Robert Chapman/Don Ford	290	72	37	253	Well reconditioning log, no geologic log below 21 feet bgs

Table 3.3-3
Well Summary (Continued)

Well I.D. Number[a]	Well Location	Owner	Estimated Surface Elevation (feet msl)	Well Depth (feet)	Depth to Water (feet bgs)	Estimated Groundwater Elevation (feet msl)	Remarks
12M3	Sec 12 NW1/4 SW1/4	Willam Danner	280	33	19	261	
T05N/R28E							
5N	Sec 5 SW1/4 SW1/4	Gerald Brooks	280	200	31	249	Basalt aquifer well, Approximate location
7A	Sec 7 NE1/4 NE1/4	Jess Leedle	265	60	35	230	Approximate location
7F	Sec 7 SE1/4 NW1/4	David Roberts	265	168	35	230	Basalt aquifer well
7J	Sec 7 NE1/4 SE1/4	Ben F. Craig	285	81	21	264	Basalt aquifer well

[a] Well ID numbers based upon USGS quarter-section identified letters.
Notes:
feet msl = feet above mean sea level
feet bgs = feet below ground surface
NA = Not Available
Source: Ecology 2002c

Table 3.3-4
Groundwater Quality Data, Irrigation Well

Analyte	Unit	October-01	MCL
Iron	mg/L	0.007	0.3
Sodium	mg/L	7	20
Hardness	mg/L	176	NA
Conductivity	µmhos/cm	393	700
Chloride	mg/L	34	250
Nitrate	mg/L	**23**	10
Sulfate	mg/L	66	250
Total Dissolved Solids	mg/L	275	500
pH	standard units	8.3	6.5-8.5

Notes:
MCL = maximum contaminant level (Federal Drinking Water Standard)
mg/L = milligrams per liter
µmhos/cm = micromhos per centimeter
NA = not available
Bold indicates MCL exceedance
Source: CH2M HILL 2002

wells. The source of elevated nitrate concentrations was not discussed in the Ecology report; however, increased nitrates are often attributed to agricultural use of fertilizer and discharges from septic systems.

3.3.1.1.3 Usage According to Water Rights

Within a 1-mile radius of the site area, there are three surface water rights. These rights are water right permits, which are not certificated rights. Groundwater rights records in the proposed plant site vicinity include seven certificated rights, and five water rights claims. There are also 10 water rights applications or permits, which are not certificated rights.

Water use on the site area is covered under two certificated groundwater rights (G4-26018C and G4-26464C) with a maximum instantaneous discharge of 6,600 gallons per minute (gpm), and a total annual discharge of 4,895.6 acre-feet (af). These water rights are currently owned by Plymouth Farm and are shared with a neighboring agricultural property (Cheran) not associated with the proposed project. From these rights, the site area was allotted a 4,400 gpm maximum instantaneous discharge and a total annual discharge of 3,640 af. There is also 1 groundwater right permit (G4-31006P) for wells owned by Plymouth Energy, with a total instantaneous discharge rate of 7,900 gpm, and a total annual discharge of 1,324 af. The purposes and recent modifications to these water rights are discussed below.

A partial point-of-diversion change application for the three water rights at the site was approved by the Benton County Water Conservancy Board (Benton County 2000) and Ecology (Ecology 2002d). The change application included a change of source from the wells to a combined source that includes groundwater and surface water. The revised point of withdrawal for the water is an existing 18-inch intake along the river southwest of the plant site, with wells remaining in use as backup sources. The reason for this change was to provide lower total dissolved solids (TDS) water for irrigation frost control, and cooling purposes on agricultural land at the site area.

A change in use application was submitted to Benton County in February 2002. The application affects water right permit G4-31006P. The application requested a change in use for the portion of the permit allotted to frost protection and cooling to industrial uses (960 af/yr). Additionally, a second change in use application for the remaining portion of the permit (364 af/yr) was submitted to allow a 20-year lease of irrigation water for industrial purposes, as necessary.

3.3.1.2 Proposed Action

Surface water and groundwater conditions at the plant site and along the infrastructure corridors are the same as site area conditions, except where additional specifics are noted below.

3.3.1.2.1 Plant Site

Groundwater wells are not present on the plant site. Groundwater conditions are expected to be similar to those of the site area. Based on the current elevations of the proposed plant site, groundwater is expected to occur between 30 and 70 feet bgs. No surface water features are present at the plant site.

3.3.1.2.2 Transmission Interconnection

The proposed transmission interconnection does not cross any surface water bodies. Fourmile Canyon is adjacent and east of the proposed transmission interconnection and within 300 feet of the proposed route at its closest approach.

3.3.1.2.3 Access Road

The proposed access road would cross Fourmile Canyon approximately 0.4 mile east of the plant site. The proposed access road would not cross any other surface water features.

3.3.1.3 Alternate 230-kV Transmission Interconnection

Existing conditions for the alternate 230-kilovolt (kV) transmission interconnection would be the same as for the proposed transmission interconnection, because the 230-kV line is located in the same physical location as the proposed 500-kV line.

3.3.1.4 Alternate Benton PUD/BPA Transmission Interconnection

3.3.1.4.1 Surface Water

The alternate Benton Public Utility District (PUD)/BPA transmission interconnection would cross Fourmile Canyon at Christy Road (see Figure 3.3-1). The route would also cross the Columbia River east of and adjacent to the Interstate 82 (I-82) bridge.

3.3.1.4.2 Groundwater

The alternate Benton PUD/BPA transmission interconnection would follow Christy Road for approximately 1.5 miles. Groundwater wells are reported along Christy Road in the vicinity, and the depth to groundwater is expected to be approximately 30 feet. Four groundwater wells (60 to 200 feet in depth) are reported near the community of Plymouth in the vicinity of the alternate Benton PUD/BPA transmission interconnection. Three of the wells are completed in the bedrock aquifer and one is in the unconsolidated aquifer. The water levels in the four wells are between approximately 20 and 35 feet bgs.

3.3.1.5 Access Alternative

Surface Water

The alternate construction and operation access roads would not cross any reported surface water bodies.

Groundwater

Groundwater conditions in the vicinity of the alternate construction and operation access roads are expected to be similar to those described for the site area. Two groundwater wells are reported in Section 9 north of Christy Road, approximately 1 mile west-southwest of the plant site (see Figure 3.3-1). These wells are reportedly 80 and 276 feet in depth (see Table 3.3-3). The shallower well is completed in the unconsolidated aquifer, and the deeper well is completed in the bedrock aquifer. A water level was not available for the shallow well, but it is expected to be 30 to 60 feet bgs, similar to that of other unconsolidated aquifer wells in the area. The bedrock well had a reported water level of 140 feet bgs.

Groundwater wells are present along Christy Road where the alternate operation access road would meet Christy Road. The depth to groundwater in this area is approximately 30 feet bgs.

3.3.2 ENVIRONMENTAL CONSEQUENCES

Significant impacts are defined by State Environmental Protection Act (SEPA) rules (Ecology1998c) as having “a reasonable likelihood of more than a moderate adverse impact on environmental quality.” Impacts related to water use would be considered significant if the water use would impair other users with senior water rights. Impacts to water quality would be considered significant if water quality standards (Ecology 1990, 1997) would be exceeded due to changes in existing water use/rights associated with the project.

Significance of impacts will be discussed with respect to the context and intensity of potential impacts. Four factors were considered in the evaluation of the level of impacts: magnitude, geographic extent, duration and frequency, and likelihood. The magnitude of impact reflects relative size or amount of an impact. The geographic extent of an impact considers how widespread the project impact might be. The duration and frequency of an impact (whether the impact is a one-time event, intermittent, or chronic) also helps define its limits. The likelihood of an impact (whether the impact is likely to occur) is the final evaluation factor. By considering each of these factors, the evaluation of impacts was kept uniform and systematic. Impacts to surface water and groundwater would be considered high (and significant), moderate or low depending on the extent to which the proposed project would (1) impair current or future surface water and groundwater conditions, quality or use, (2) result in a change in overall surface water and groundwater conditions or quality, or (3) conflict with applicable regulations.

3.3.2.1 No Action Alternative

There would be no impacts associated with the No Action Alternative. Land use and associated water use and quality would not be expected to change from existing conditions.

3.3.2.2 Proposed Action

Several potential environmental consequences associated with the construction and operation of the PGF have been identified. Construction activities associated with the proposed project could result in the discharge of sediment and other substances that could have an adverse effect on surface water quality if not properly managed. If the project were to result in an indirect increase in the diversion of surface water from the Columbia River and groundwater in connection to the river, an impact on beneficial uses of the river that depend on surface water flow could occur. Wastewater and stormwater management, reuse, and disposal practices could have an adverse effect on groundwater quantity and quality. These potential impacts will be mitigated to less than significant levels by provisions of the Proposed Action as described below.

3.3.2.2.1 Site Area

Construction Impacts

There would be no impacts associated with construction in the site area that would not be mitigated by the planned stormwater runoff control measures for construction activities, which are discussed in Section 3.3.3 Summary of Impacts.

Operation Impacts

Surface Water

No changes to the existing condition are expected as a result of this project, because surface water withdrawal would be associated with the irrigation of site area crops, and not the plant site operations.

Groundwater

The volume of groundwater pumped from the wells in the site area has been decreased based on the 2000 water right change, which allowed surface water withdrawals. Project withdrawals would be less than historical groundwater withdrawals at the site area, and, as previously determined by Benton County and Ecology, are not expected to impair any other water rights.

The primary groundwater quality impact at the plant site and surrounding agricultural property would be from the land application on the adjoining agricultural property of water from the plant wastewater storage pond. This wastewater handling and disposal would be governed by the plant's Industrial Waste Discharge Permit issued by Ecology. The permit application would include an engineering report that outlines in more detail wastewater handling and disposal measures. The majority of the wastewater would be from the facility's cooling tower system. Minor amounts of wastewater would be generated by building floor drains, water treatment plant flush water, reverse osmosis (water treatment) rejects, and boiler blowdown water. Wastewater from floor drains would pass through an oil/water separator, a standard component of floor drains, prior to discharge into the wastewater pond. Only clean water that leaks out of the system would enter the floor drain. Under PGF plant standard operating procedures, chemicals leaked due to spills would be cleaned up and would not be allowed to enter the floor drain system.

The PGF cooling tower system design is based on 5 to 10 cycles of concentration of cooling water prior to disposal. The number of cycles is dependent on water chemistry. As the water cycles through the cooling tower system, evaporation would increase the concentration of total dissolved solids (TDS) in the water. Blowdown would remove the impurities (i.e., water with elevated levels of TDS) that collect in the cooling tower, and the blowdown water would be transferred to the wastewater pond adjacent to the PGF. Prior to irrigation application, blowdown water would be diluted by a factor between approximately 5:1 and 10:1, depending on the water source (river or groundwater) and the TDS concentration of the wastewater. It is calculated that the volume of wastewater generated by the cooling system would be consumed during the irrigation season (May to October). Approximately 98 to 200 af/yr of wastewater would be generated and combined with irrigation water for land application. This is equivalent to approximately 4 to 9 percent of the total water required for use by the agricultural property for irrigation (2,184 af/yr). An analysis by CH2M HILL (Appendix A) indicated that, after dilution with river or well water, TDS and other constituents would be well below applicable levels that could affect irrigated crops.

The water used for irrigation would contain TDS higher than the Columbia River and local groundwater, and some of the irrigated water would likely recharge the underlying aquifer. This may lead to a long-term increase in TDS in groundwater in the site vicinity. The expected diluted wastewater TDS concentration (382 milligrams per liter [mg/L]) would be well below the drinking water standard (500 mg/L). Application of the diluted wastewater would not result in exceedances of drinking water standards for TDS or other drinking water constituents in the area. Additionally, because irrigation occurs over a six-month period, aquifer underflow and precipitation during the remainder of the year would act to decrease TDS concentrations in soil and groundwater. As part of the permit process, an engineering report for wastewater land application would be prepared. This report would include evaluations of site area soils and irrigation requirements, process wastewater constituents, and a proposed crop plan (as part of the Industrial Waste Discharge Permit) for use of the diluted wastewater for irrigation. As part of this plan, a monitoring program would be implemented for the process wastewater and site soils. With proper wastewater treatment and land application, the impacts of wastewater application at the site area are expected to be less than significant. See Appendix A for further information on land application of wastewater.

3.3.2.2.2 Plant Site

Construction Impacts

Surface Water

The greatest potential impact on surface water quality during construction would be from sedimentation and erosion, which cause soil particles to become suspended in stormwater that flows over the exposed soil surfaces. During construction, this could occur as a result of excavation and grading activities and vehicular traffic entering and leaving the site. However, based on the climatic data at the site, the likelihood of significant volumes of surface water runoff is small.

A detailed stormwater drainage plan for the PGF would be required for this project in accordance with Ecology guidelines. During construction, stormwater runoff and discharge at the site would be controlled in accordance with a construction stormwater discharge permit issued by Ecology. Best Management Practices (BMPs) such as hay bales and/or silt fences would minimize potential sediment loading of surface water during the construction phase. Additionally, the stormwater basin would be the first element of the project constructed and would be available for use during the construction phase. In accordance with the drainage plan and construction stormwater discharge permit, the impacts of construction activities are expected to be low to moderate and therefore less than significant.

Groundwater

There would be no construction-related impacts associated with groundwater and water supply. Construction activities are not expected to encounter groundwater, and surface activities are considered to be too short in duration to affect the quantity or quality of groundwater resources.

Operation Impacts

Surface Water

Potential impacts to surface water would be limited to onsite stormwater runoff. Potential impacts from sedimentation and erosion could result in soil particles becoming suspended in stormwater that flows over exposed soil surfaces. However, following construction and revegetation of unpaved areas, and installation of the stormwater collection system within the paved areas, it is expected that erosion impacts would be less than significant. Other potential impacts would include contamination of stormwater runoff by accidental chemical or petroleum product spills, which are addressed in Section 3.6, Environmental Health. There are no permanent surface water bodies on the plant site, and there would be no significant stormwater runoff from the plant site during PGF operation.

A detailed stormwater drainage plan for the PGF will be required in accordance with Ecology guidelines.

Onsite stormwater runoff that does not infiltrate directly into the soil would be collected and conveyed to a stormwater pond in accordance with the drainage plan. The stormwater runoff would be collected from impervious surfaces, pass through an oil/water separator, and then flow to an onsite stormwater retention pond. The stormwater would then evaporate or infiltrate into the ground.

In addition to the requirements of the drainage plan, the site must also comply with the National Pollution Discharge Elimination System (NPDES) permit issued by Ecology. The NPDES permit, as well as Ecology's Surface Water Design Manual (SWDM), mandates that stormwater control facilities are provided to manage the volume of water resulting from the 10-year, 24-hour storm event. Maintenance of all on-site stormwater facilities must comply with BMPs. These requirements would minimize the potential for any local flooding impacts.

The NPDES permit requires compliance with the Federal Clean Water Act of 1972 and the Water Quality Act of 1987. These regulations stipulate that a Spill Prevention and Emergency Response (SPER) Plan and a Stormwater Pollution Prevention Plan (SWPPP) are to be prepared for the site. The SPER plan provides procedures for the prevention, containment, control, and cleanup of spills or unplanned discharges of oil and petroleum products and other materials that may pollute waters of the state. The SWPPP provides documentation of the BMPs, location of structures and drainages, personnel training, and inspection procedures for the control of stormwater. An assessment of the SWPPP BMPs is required biannually, with one inspection occurring during the wet season and one during the dry season. In accordance with the NPDES, SPER, and SWPPP, the potential impacts of operation activities are considered low to moderate and therefore less than significant.

Groundwater

The overall infiltration of precipitation into the ground is expected to decrease over the disturbed area of the site (21.9 acres), including the wastewater storage pond. This may result in a slight decrease in recharge to the underlying aquifer. The most significant cause for this decrease would be interception by the proposed wastewater pond and evaporation of water from that pond. Precipitation that accumulates in this pond would be used as irrigation water on the surrounding Plymouth Farm in the site area. Some of the irrigation water is expected to recharge the aquifer, thereby partially offsetting the interception of precipitation and evaporation of water from the wastewater pond. Precipitation that collects on the other impervious surfaces around the plant site (e.g., paved areas and buildings) would be discharged into a stormwater pond and would have a minimal effect on aquifer recharge. The total change to groundwater recharge in the site area (plant site and surrounding agricultural property) is expected to be less than significant.

A potential groundwater quality impact at the plant site would be associated with the installation and use of the onsite septic system. Sanitary wastes generated at the site would come from toilet and lunchroom facilities provided for plant operating personnel in the administration building. Sanitary wastes would be discharged into a small onsite pressure distribution-type septic system. The septic system would be permitted under the jurisdiction of the Benton-Franklin Health Department and would be installed in accordance with their requirements. Discharge flowrate to the system is estimated to be less than 500 gallons per day; however, the system would be designed for a minimum of 500 gallons per day. The system would include a 1,000-gallon precast concrete septic tank, pump chamber, and associated disposal field. The disposal field would be located in the open area just north of the wet cooling towers. The soil at the site is generally characterized as Type III loamy sands (see Section 3.1 Earth). Maximum application rate for this type of soil is 0.727 gallons per day per square foot. The required area of disposal field is about 690 square feet. Three 80-foot perforated pipe distribution laterals in 3-foot-wide trenches 10 feet apart would be provided.

The primary water quality consideration with respect to a septic system is the potential for nitrate loading to the groundwater at the plant site from the septic system. Existing nitrate concentrations at the plant site have been shown to be elevated above drinking water standards, most likely due to existing agricultural operations in the area. Based on Hantzsche and Finnemore (1992) calculations, the groundwater nitrate concentration would increase approximately 0.9 percent in the immediate vicinity of the drainfield (see Table 3.3-5). Based on these calculations, it is expected that the increase in nitrate concentration in the groundwater from a properly designed, operated, and maintained septic system would be low to moderate and therefore less than significant.

3.3.2.2.3 Transmission Interconnection

Surface Water

Construction and operation impacts associated with the proposed transmission interconnection would be limited to erosion issues similar to those discussed for the plant site. During construction, stormwater runoff would be controlled in accordance with the drainage plan and a construction stormwater discharge permit issued by Ecology. Therefore, the impacts of construction and operation of the transmission interconnection are considered low to moderate and therefore less than significant.

Groundwater

There would be no groundwater impacts associated with construction or operation of the transmission interconnection.

3.3.2.2.4 Access Road

Surface Water

Construction of the proposed access road would involve construction of approximately 5,300 feet of new roadway between the existing Plymouth Industrial Road and the proposed plant site. Construction and operation impacts associated with the proposed road access would be limited to erosion issues similar to those discussed for the plant site. During construction, stormwater runoff from the access road would be controlled in accordance with the drainage plan and a construction stormwater discharge permit issued by Ecology. With the drainage plan, construction stormwater discharge permit, and revegetation, it is expected that the impacts of construction and operation activities would be low to moderate and therefore less than significant.

Table 3.3-5
Nitrate Impact for Onsite Septic System

Equation definitions	Value	Units	Comments
I = Volume rate of water over gross developed area	122.22	in/yr	based on 500 gpd over 2,400 sq. ft drainfield (per NESCO, 2002)
n_w = nitrogen concentration in wastewater	45	mg/L	Typical value (per Hantzsche & Finnemore, 1992)
d = fraction of denitrification in soil	0	n/a	Conservative value (per Hantzsche & Finnemore, 1992)
R = average recharge rate from precipitation	4.5	in/yr	estimated from months of surplus precipitation
n_b = background nitrogen concentration	23	mg/L	based on well water sample collected by CH2MHill (2002)
n_r = average nitrate concentration from septic system	44.2	mg/L	

Weighted average nitrate concentration with respect to aquifer underflow

Equation definitions	Value	Units	Comments
groundwater gradient =	0.001	ft/ft	conservative estimate, less than topography
Width of drainfield =	50	ft	based on proposed septic design
Aquifer Transmissivity =	125,000	ft^2/day	estimated from well log pump test values
Aquifer Underflow =	6,250	ft^3/day	= TiW (transmissivity x gradient x site width)
Aquifer Discharger =	50,000	gpd	
Septic system discharge =	500	gpd	
Total Nitrate Concentration =	23.210	mg/L	
Change from background concentrations =	0.91%		

Notes:
Average concentration in groundwater below septic system

$$n_r = \frac{In_w\,(1-d) + Rn_b}{(I+R)}$$

Source: Hantzsche and Finnemore, 1992

The proposed access road would cross Fourmile Canyon. The current design includes a fill roadway with a culvert to allow passage of intermittent flows in the canyon. It is expected that the impacts of construction and operation activities would be low to moderate and therefore less than significant.

Groundwater

There would be no groundwater impacts associated with construction and operation of the access road.

3.3.2.3 Alternate 230-kV Transmission Interconnection

Impacts attributable to the alternate 230-kV transmission interconnection would be the same as those attributable to the proposed transmission interconnection, because the proposed 500-kV transmission line is located in the same physical location as the 230-kV transmission line.

3.3.2.4 Alternate Benton PUD/BPA Transmission Interconnection

Surface Water

Construction and operation impacts associated with the alternate Benton PUD/BPA transmission interconnection would be limited to erosion issues similar to those discussed for the plant site. During construction, stormwater runoff from disturbed areas along the alternate Benton PUD/BPA transmission interconnection would be controlled as needed to comply with the drainage plan and a construction stormwater discharge permit issued by Ecology. With the drainage plan, construction stormwater discharge permit, and revegetation, it is expected that the impacts of construction and operation of the alternate Benton PUD/BPA transmission interconnection would be low to moderate and therefore less than significant.

Groundwater

There would be no impacts on groundwater associated with construction or operation of the alternate Benton PUD/BPA transmission interconnection.

3.3.2.5 Access Alternative

3.3.2.5.1 Alternate Construction Access Road

Surface Water

Construction of the alternate construction access road would involve improvement of approximately 7,500 feet of roadway between Christy Road and the proposed plant site. Impacts associated with use of this road would be limited to erosion issues similar to those discussed for the plant site. During road improvement, stormwater runoff from the road would be controlled in accordance with the drainage plan and a construction stormwater discharge permit would be issued by Ecology. With the drainage plan, construction stormwater discharge permit, and revegetation, it is expected that impacts would be low to moderate and therefore less than significant.

Groundwater

There would be no groundwater impacts associated with improvement and use of the alternate construction access road.

3.3.2.5.2 Alternate Operation Access Road

Impacts would be similar to those that would result from the improvement and use of the alternate construction access road.

3.3.3 SUMMARY OF IMPACTS

Several design features would be included in the proposed project that would minimize project impacts. As part of the proposed project, wastewater would be transferred and stored in the plant site's lined wastewater storage pond, which would be sized to contain the generated volume of wastewater. Wastewater that does not evaporate would be used for irrigation on the adjoining Plymouth Farm agricultural property. Prior to irrigation, the water would be diluted by raw river water or groundwater to reduce TDS and other constituents well below levels that could affect irrigated crops or significantly impact groundwater quality.

An onsite septic system would be required for sanitary wastewater disposal at the site. The onsite system would be approved by the Benton/Franklin Health District through a Sanitary Waste Discharge Permit. With proper design and operation, the additional nitrate impact in the site area is not expected to be significant.

Recharge of groundwater by precipitation on the disturbed area of the plant site would be decreased due to interception of precipitation and evaporation. However, the net change to recharge would be counteracted by the land application of wastewater on the surrounding site area. Over the entire site area, the total net change to recharge would be minor.

Wastewater handling and disposal would be in accordance with an Industrial Waste Discharge Permit that would be issued by Ecology. Land application of diluted wastewater through the site area irrigation system could affect TDS concentrations in the local groundwater system. As part of the plant's final design and permitting, an engineering report for industrial process water land application would be completed. The engineering report would include evaluations of site area soils and irrigation requirements, process wastewater constituents, and a proposed crop plan for use of the diluted wastewater for irrigation. As part of this plan, a monitoring program would be implemented for the process wastewater and site soils. In addition, a crop management plan would be developed in order to assess impacts, if any, to the site area and to refine the land application plan, as necessary, to ensure the groundwater would be protected from significant impacts from the wastewater application. See Appendix A for a discussion of land application of wastewater.

Stormwater runoff and discharge would be controlled by BMPs, including hay bales and/or silt fences, to minimize potential runoff. Stormwater at the plant site that does not evaporate or infiltrate directly from the site would be conveyed to a stormwater pond. The onsite stormwater pond would be the first element of the project constructed and would be available for use during the construction phase. The disturbed areas of the plant site would be revegetated as soon as possible following construction activities. A detailed stormwater drainage plan would be prepared in accordance with Ecology guidelines. Additionally, an NPDES permit would be obtained from Ecology and an SWPPP would be prepared for the site. Design parameters, monitoring, and BMPs for conveying, treating, and discharging stormwater would be in accordance with these documents.

3.3.4 MITIGATION MEASURES

No significant impacts to water would result from the proposed project. Therefore, no mitigation measures are required.

3.3.5 REFERENCES

Benton County, Water Conservancy Board. 2000. Certificate of Conditional Approval and Record of Decision. March 30.

Federal Emergency Management Agency (FEMA). July 19, 1982. Flood Insurance Rate Map. Benton County Washington (unincorporated areas). Panels 945 and 950 of 1075.

Hantzsche, N.N., and Finnemore, E.J. 1992, "Predicting Ground-Water Nitrate-Nitrogen Impacts." *Groundwater*, Volume 30, no. 4, p. 490-499.

NESCO. 2002. Septic System Description, unpublished. Received March 20.

United States Department of Agriculture. 1990. *State of Washington Irrigation Guide*.

United States Geological Survey (USGS). 1999. Summary of the Columbia Plateau Regional Aquifer-System Analysis, Washington, Oregon, and Idaho. Professional Paper 1413-A.

———. 2002. Surface Water Data for Washington. Available at <http://waterdata.usgs.gov/wa/nwis/sw>. Accessed February 25.

Washington Department of Ecology (Ecology). 1990. "Water Quality Standards For Ground Waters of the State of Washington" (Chapter 173–200 Washington Administrative Code [WAC]). Updated October 31.

———. 1996. *A Report on Nitrate Contamination of Ground Water in the Mid-Columbia Basin.* Publication No. 96-17, dated September 17.

———. 1997. "Water Quality Standards for Surface Waters of the State of Washington" (Chapter 173-201A WAC). Updated November 18.

———. 1998a. "Instream Resources Protection Program for the Main Stem Columbia River in Washington State" (Chapter 173-563 WAC). Updated March 30.

———. 1998b. "Water Resources Program for the John Day-McNary Pools Reach of the Columbia River, WRIA 31 and Parts of WRIA's 32, 33, 36, and 37" (Chapter 173-561A WAC). Updated March 30.

———. 1998c. SEPA Rules. (Chapter 173-561A WAC). Updated March 4.

———. 2002a. Final 1998 Section 303(d) List. Available at <http://www.ecy.wa.gov/programs/wq/303d/1998/wrias/wria31.pdf>. Accessed February 27.

———. 2002b. Station 31A070 Six Year Water Quality Data Summary. Available at <http://www.ecy.wa.gov/programs/eap/fw_riv/data/rv18b070.html>. Accessed February 26.

———. 2002c. Unpublished well logs, received February.

———. 2002d. Letter to Shore Properties, Inc. regarding Application to Change Water Rights. May 15.

Washington Department of Health. 1995. "Group B Public Water Systems" (Chapter 246-291 WAC). November.

———. 2002. Letter to Benton County Planning Department re: Plymouth Generating Facility Comments on Scope of Environmental Impact Statement. January 24.

Washington Department of Natural Resources (WDNR). 1994. Geologic Map of the East Half of the Washington Portion of the Goldendale 1:100,000 Quad and the Washington Portion of the Hermiston 1:100,000 Quad, compiled by Eric Schuster, Open-File Report 94-9.

Western Regional Climate Center (WRCC). 2002. McNary Dam, Washington (455231) Period of Record Monthly Climate Summary, <http://www.wrcc.dri.edu/cgi-bin/cli-bin/cliRECtM.pl?wamcna> accessed February 22.